

CLAIMS:

1        1.    A method for remediating drilled cuttings containing oil  
2    and water from a wellbore, the method comprising  
3            introducing drilled cuttings with oil and water to  
4    a system for remediation, the system including a thermal  
5    treatment system and a condensing system,  
6            feeding a slurry of the cuttings with oil and water  
7    to the thermal treatment system and heating the drilled  
8    cuttings and oil and water therein producing heated cuttings  
9    and a stream with oil and water and solids therein,  
10          discharging the heated cuttings from the thermal  
11    treatment system,  
12          feeding the stream with oil and water and solids  
13    therein to a dual component separation system producing  
14    separated-out solids and a vapor with oil and water therein,  
15          feeding the vapor to a condenser system producing a  
16    liquid stream, and  
17          feeding the liquid stream to an oil/water separator  
18    apparatus producing an oil stream and a water stream.

1        2.    The method of claim 1 further comprising  
2            quenching the vapor with oil and water therein in a  
3    quench system prior to feeding said vapor to the condenser  
4    system.

1        3.    The method of claim 2 wherein the quench system is  
2    operated so that its heat content remains substantially constant.

1        4.    The method of claim 3 wherein the quench system comprises  
2    a vessel, inlet means for receiving the vapor with oil and water,  
3    and spray means for spraying cooling liquid into said vapor, and  
4    the method further comprising  
5            spraying with the spray means said vapor with  
6    cooling liquid.

1        5.    The method of claim 4 wherein the cooling liquid includes  
2    liquid recirculated from the vessel to the spray means, the method

3 further comprising

4           recirculating cooling liquid from the vessel to the  
5           spray means.

1           6. The method of claim 4 wherein the spray means sprays  
2           cooling liquid into the inlet means.

1           7. The method of claim 4 wherein the spray means sprays  
2           cooling liquid into the vessel.

1           8. The method of claim 2 further comprising  
2           pumping uncondensed quenched vapor to the condenser  
3           system.

1           9. The method of claim 1 further comprising  
2           recirculating vapor through the dual component  
3           separator to enhance efficiency of solids separation by the  
4           dual component separator.

1           10. The method of claim 1 wherein the dual component  
2           separator is insulated to reduce condensation of material within  
3           the dual component separator.

1           11. The method of claim 1 wherein a cooling apparatus  
2           provides cooling fluid for cooling the condenser to enhance  
3           effectiveness of the condenser, the method further comprising  
4           cooling the condenser with cooling fluid from the  
5           cooling apparatus.

1           12. The method of claim 1 further comprising  
2           producing noncondensables with the condenser, and  
3           oxidizing the noncondensables.

1           13. The method of claim 12 wherein the noncondensables are  
2           oxidized in a thermal oxidizer.

1           14. The method of claim 1 wherein the thermal treatment  
2           system comprises a vessel with an interior wall dividing the vessel  
3           into two intercommunicating chambers, the vessel having two spaced-  
4           apart ends and a burner at each end for heating the drilled  
5           cuttings in each chamber.

1           15. The method of claim 14 wherein each burner is in a

2 separate firebox adjacent each chamber.

1 16. The method of claim 14 wherein each burner is mounted  
2 within the vessel.

1 17. The method of claim 1 further comprising  
2 centrifuging the oil stream from the oil/water  
3 separator apparatus to clean oil in said oil stream.

1 18. The method of claim 1 wherein an initial mixture of  
2 wellbore cuttings, oil, water and drilling fluid is fed to a shaker  
3 system, the method further comprising

4 producing the slurry of drilled cuttings with oil  
5 and water with the shaker system.

1 19. The method of claim 1 further comprising, prior to  
2 feeding the slurry to the thermal treatment system,

3 feeding the slurry through a secondary separator  
4 system to a hopper,

5 separating large pieces of material from the slurry  
6 with the secondary separator system, and then

7 feeding the slurry from the hopper to the thermal  
8 treatment system.

1 20. The method of claim 1 wherein the slurry contains by  
2 volume a 100% mixture of up to about 30% oil, up to about 30%  
3 water, and up to about 50% drilled cuttings and the method  
4 processes at least about 2 tons per hour of slurry.

5 21. The method of claim 1 wherein the slurry contains by  
6 volume about 38% water and the method processes about 1.2 tons per  
7 hour of slurry.

1 22. The method of claim 1 wherein the slurry includes fine  
2 particulates and the dual component separator system is for  
3 removing fine particulates, the method further comprising prior to  
4 feeding the stream with oil and water to the condenser system,

5 separating out with the dual component separator  
6 system fine particulates from the stream with oil and water.

1 23. The method of claim 1 wherein the slurry has hydrocarbon

contaminants therein and the method further comprising  
volatilizing the hydrocarbons contaminants in the  
thermal treatment system to separate them from the slurry.

24. The method of claim 1 wherein the slurry has  
volatilizable contaminants therein and the method further  
comprising

volatilizing the volatilizable contaminants in the  
thermal treatment system to separate them from the slurry.

25. The method of claim 1 wherein the system includes heat  
exchange apparatus and the method further comprising

cooling the liquid stream prior to feeding it to the  
oil/water separator.

26. The method of claim 1 further comprising

feeding the oil stream from the oil/water separator  
to the thermal treatment system for fuel for the thermal  
treatment system.

27. The method of claim 1 wherein the system includes  
rehydration apparatus and the method further comprising

rehydrating the discharged heated cuttings from the  
thermal treatment system with the rehydration apparatus to  
facilitate handling of the heated cuttings.

28. The method of claim 1 wherein the system includes  
scrubber apparatus for cleaning heated cuttings exhausted from the  
thermal treatment system, the method further comprising

scrubbing said heated cuttings with the scrubber  
apparatus.

29. The method of claim 1 wherein the system includes  
scrubber apparatus for cleaning solids exhausted from the dual  
component separator, the method further comprising

scrubbing said solids with the scrubber apparatus.

30. The method of claim 1 further comprising

feeding the heated cuttings from the thermal  
treatment system to mill apparatus for hydration.

1 31. The method of claim 1 further comprising  
2 feeding the separated-out solids from the dual  
3 component separator to mill apparatus for hydration.  
1 32. Any invention disclosed herein.

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